

**National Marine Fisheries Service
Endangered Species Act Section 7 Consultation
Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat
Consultation**

ACTION AGENCIES: NOAA's National Marine Fisheries Service (NMFS)
Bureau of Indian Affairs (BIA)
US Fish and Wildlife Service (USFWS)

SPECIES/ESU AFFECTED: Puget Sound Chinook Salmon

ACTIVITIES CONSIDERED: The Endangered Species Act (ESA) Section 7 Consultation /
Magnuson-Stevens Act Essential Fish Habitat (EFH) Consultation:
Puget Sound Comprehensive Chinook Management Plan: Harvest
Management Component - ESA section 4(d) Decision /
Determination

CONSULTATION BY: NMFS Northwest Region (NWR)
Sustainable Fisheries Division (SFD)
Consultation number: 2004/00731

This is NMFS' ESA section 7 consultation and EFH consultation on a proposed Federal action. The proposed Federal action has three components (sub-actions), which the action agencies have chosen to coordinate as a package for these consultations.

The primary Federal sub-action is:

- (1) NMFS' proposed determination as to whether a resource management plan (the Puget Sound Comprehensive Chinook Management Plan: Harvest Management Component) adequately addresses the criteria in its salmon and steelhead ESA section 4(d) regulations (50 CFR 223.203) (hereafter referred to as the ESA 4(d) Rule).

Two other Federal sub-actions evaluated in these consultations include:

- (2) The proposed BIA funding of Puget Sound tribes' management, enforcement, and monitoring projects in support of the resource management plan; and
- (3) the proposed authorization of fisheries by the USFWS, as party to the Hood Canal Salmon Management Plan (Point No Point Treaty Council *et al.* 1986), that are consistent with the implementation of the resource management plan, as approved under the ESA 4(d) Rule.

ESA Section 7 Consultation - Biological Opinion and
Magnuson-Stevens Act Essential Fish Habitat Consultation Puget Sound Harvest RMP – December, 2004

This Biological Opinion has been prepared in accordance with section 7 of the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 *et seq.*) and in compliance with the Data Quality Act (§515 of PL 106-554). It is based on information provided in the resource management plan, NMFS' Evaluation and Recommended Determination document (ERD), comments from reviewers, and other sources representing the best available scientific information. These documents comprise the best available scientific information regarding the effects of the proposed Federal action. A complete administrative record for this consultation is on file with NMFS NWR in Seattle, Washington.

Approved by:


D. Robert Lohn, Regional Administrator

Date:

DEC 16 2004

Expiration Date:

May 1, 2010

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1.0 ESA Section 7 Consultation - Biological Opinion

This document constitutes NMFS' biological opinion under section 7 of the ESA for the following sub-actions proposed by the NMFS, BIA and the USFWS:

- (1) The proposed NMFS determination as to whether a resource management plan satisfies the criteria outlined in the ESA 4(d) Rule;
- (2) The proposed BIA funding of Puget Sound tribes' management, enforcement, and monitoring projects in support of the resource management plan as approved under the ESA 4(d) Rule; and
- (3) The proposed USFWS authorization of fisheries, as party to the Hood Canal Salmon Management Plan (Point No Point Treaty Council *et al.* 1986), that are consistent with the implementation of the resource management plan as approved under the ESA 4(d) Rule.

NMFS is grouping these three proposed Federal sub-actions in this consultation pursuant to 50 CFR 402.14 (b) because they are similar actions occurring within the same geographical area. The impacts associated the latter two Federal sub-actions are considered fully in the proposed NMFS determination. There would be no other environmental effects associated with the latter two Federal sub-actions that are not contemplated and evaluated in the proposed NMFS determination.

1.1 Introduction

This Biological Opinion considers impacts of the proposed action on Puget Sound chinook salmon listed under the ESA. Other species of listed anadromous salmonids occur in the Pacific Northwest, but for several reasons, summarized below, the proposed Federal actions are not expected to have an effect on these other species.

On March 24, 1999, NMFS listed the Puget Sound chinook salmon (*Oncorhynchus tshawytscha*) Evolutionarily Significant Unit¹ (ESU) as a threatened species under the ESA (64 FR 14308). The Puget Sound Chinook Salmon ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound from the Elwha River, eastward. Major river systems within the ESU supporting chinook salmon populations include the Nooksack, Skagit, Stillaguamish, Snohomish, Cedar, Duwamish-Green, White, Puyallup, Nisqually, Skokomish, Mid-Hood Canal, Dungeness, and Elwha Rivers. Chinook salmon (and their progeny) from the following hatchery stocks are also currently listed under the ESA:

¹ An Evolutionarily Significant Unit or "ESU" is a collection of one or more Pacific salmon populations that share similar genetic, ecological, and life history traits but differ in important ways from salmon in other ESUs. Salmon ESUs are considered to be "distinct population segments" under the Federal Endangered Species Act (ESA).

Kendall Creek; North Fork Stillaguamish River; White River; Dungeness River; and Elwha River.

On July 10, 2000, NMFS issued the ESA 4(d) Rule establishing take prohibitions for 14 salmon and steelhead ESUs, including the Puget Sound Chinook Salmon ESU (50 CFR 223.203(b)(6); July 10, 2000, 65 FR 42422). The ESA 4(d) Rule provided limits on the application of the take prohibitions, i.e., take prohibitions would not apply to the plans and activities set out in the rule if those plans and activities met the rule's criteria. One of those limits (Limit 6) applies to joint tribal and state resource management plans.

On March 18, 2004, the Puget Sound Treaty Tribes (PSTT) and the Washington Department of Fish and Wildlife (WDFW) submitted a jointly developed resource management plan to NMFS, Northwest Regional Office. The resource management plan, titled the “Puget Sound Comprehensive Chinook Management Plan: Harvest Management Component,” dated March 1, 2004 (hereafter referred to as the RMP), provides the framework within which the tribal and state jurisdictions would jointly manage all salmon and gillnet steelhead fisheries that might impact listed chinook salmon within the greater Puget Sound area. The PSTT and WDFW (jointly hereafter referred to as co-managers) propose that the RMP be in effect for six years, from May 1, 2004, through April 30, 2010.

NMFS published a notice in the *Federal Register* announcing the availability of its Proposed Evaluation and Pending Determination (PEPD) on the RMP for public review and comment on April 15, 2004 (69 FR 19975). The comment period closed on May 17, 2004. Several of the comments were addressed and reflected in NMFS’ final Evaluation and Recommended Determination (ERD). The co-managers made no modifications to the RMP based on public comments received on NMFS’ PEPD.

1.2 Consultation History

NMFS has considered the effects of Puget Sound salmon fisheries on listed Puget Sound chinook salmon in several other ESA section 7 consultations or ESA 4(d) Rule determinations completed in recent years. These consultations and determinations were:

- (1) An April 28, 2000, biological opinion titled “Effects of Pacific Coast Ocean and Puget Sound Salmon Fisheries During the 2000-2001 Annual Regulatory Cycle” that was effective from May 1, 2000 through April 30, 2001.
- (2) A biological opinion titled “Endangered Species Act - Reinitiated Section 7 Consultation- Biological Opinion - Approval of the Pacific Salmon Treaty by the U.S. Department of State and Management of the Southeast Alaska Salmon Fisheries Subject to the Pacific Salmon

Treaty.” Completed November 18, 1999, this biological opinion is effective through December 31, 2010.

- (3) A September 14, 2001, biological opinion titled “Programs Administered by the Bureau of Indian Affairs and Activities Authorized by the U.S. Fish and Wildlife Service Supporting Tribal Salmon Fisheries Affecting Listed Puget Sound chinook and Hood Canal summer-run chum salmon Evolutionarily Significant Units” was effective through April 30, 2003.
- (4) The ESA 4(d) Rule determination completed on April 27, 2002, and titled “Joint State Tribal Resource Management Plan Provided by the Washington Department of Fish and Wildlife and the Puget Sound Tribes for Salmon Fisheries Affecting Puget Sound Chinook Salmon Under Limit 6 of the ESA 4(d) Rule - Determination Memorandum”. NMFS’ ESA 4(d) Rule determination for the subject plan was effective through April 30, 2003.
- (5) The ESA 4(d) Rule determination completed on May 19, 2003, and titled “Joint Tribal and State Resource Management Plan (RMP) submitted under Limit 6 of the ESA 4(d) Rule by the Puget Sound Tribes and the Washington Department of Fish and Wildlife for salmon fisheries and steelhead net fisheries affecting Puget Sound chinook salmon - Determination Memorandum”. NMFS’ ESA 4(d) Rule determination for the subject plan was effective through April 30, 2004.
- (6) An April 29, 2004, biological opinion titled “Effects of the Pacific Coast salmon harvest plan and U.S. Fraser Panel fisheries on the Puget Sound chinook and lower Columbia River Chinook Salmon Evolutionarily Significant Units” is effective until revoked.
- (7) A June 10, 2004, biological opinion titled “Effects of Programs Administered by the Bureau of Indian Affairs supporting tribal salmon fisheries management in Puget Sound and Puget Sound salmon fishing activities authorized by the U.S. Fish and Wildlife Services during the 2004 fishing season” is effective through April 30, 2005.

On April 27, 2001, NMFS issued a Limit 6 determination under the ESA 4(d) Rule on a resource management plan considering fishery management activities impacting listed Hood Canal summer-run chum salmon, limiting the application of the ESA section 9 take prohibitions for those fisheries operating consistent with the resource management plan (June 12, 2001, 66 FR 31600).

The effects of Puget Sound salmon fisheries on the Snake River fall chinook salmon, Snake River spring/summer chinook salmon, and Snake River sockeye salmon, Sacramento River winter chinook salmon, Southern Oregon/Northern California Coastal coho salmon, Central California Coastal coho salmon, Oregon Coastal natural coho salmon, Central Valley spring-run

chinook salmon, California coastal chinook salmon, lower Columbia River chinook salmon, upper Willamette River chinook salmon, upper Columbia River spring chinook salmon, Columbia River chum salmon, Hood Canal summer-run chum salmon, Ozette Lake sockeye salmon, and ten steelhead ESUs have been considered for ESA compliance through completion of other long-term biological opinions or the ESA 4(d) Rule evaluation and determination processes. These ESUs will therefore not be discussed further in this Biological Opinion.

1.3 Description of the Proposed Action

The primary Federal action is NMFS' proposal to issue a determination as to whether the RMP provided by the co-managers adequately addresses the requirements of Limit 6 under the ESA 4(d) Rule. NMFS is including two other proposed Federal actions as sub-actions in this consultation pursuant to 50 CFR 402.14 (b) because all are similar actions within a given geographical area. The duration of NMFS' determination for these Federal actions will extend through April 30, 2010, unless changed during any re-initiation (see Re-initiation of Consultation section, below). The following are the three proposed Federal actions that will be analyzed in this consultation:

(1) NMFS' ESA 4(d) Rule Determination Regarding the RMP:

NMFS proposes to issue a decision that the RMP adequately addresses the requirements of Limit 6 under the ESA 4(d) Rule. As mentioned earlier, a biological opinion issued by NMFS on June 10, 2004, titled "Effects of Programs Administered by the Bureau of Indian Affairs supporting tribal salmon fisheries management in Puget Sound and Puget Sound salmon fishing activities authorized by the U.S. Fish and Wildlife Services during the 2004 fishing season," is effective through April 30, 2005. Therefore, NMFS' evaluation and determination of the RMP under the ESA 4(d) Rule will address only from May 1, 2005 through April 30, 2010 of the proposed duration of the RMP.

The RMP does not include the specific details of the annual fishing regime, i.e., where and when fisheries occur; what gear will be used; or how harvest is allocated among gear, areas, or fishermen. However, the RMP does provide the management objectives against which the co-managers will develop their action-specific fishing regimes to protect listed Puget Sound chinook salmon. Therefore, NMFS anticipates evaluating each year's proposed fishery management for consistency with the RMP's objectives, after cooperative discussion with the co-managers.

Management objectives specified in the RMP account for fisheries-related mortality throughout the migratory range of Puget Sound chinook salmon, from Oregon to Southeast Alaska. The RMP implements limits to the cumulative directed and incidental fishery-related mortality to

each population or management unit included within the listed Puget Sound Chinook Salmon ESU. The RMP's limits on the cumulative fishery-related mortality are expressed as: a rebuilding exploitation rate; an upper management threshold; a low abundance threshold; and a critical exploitation rate ceiling (see Table 2 in the ERD document). The following is a brief description of these RMP limits:

Rebuilding Exploitation Rate: The RMP's rebuilding exploitation rates are outlined in Table 2 in the ERD document. The co-managers define exploitation rate as the "[t]otal mortality in a fishery or aggregate of fisheries expressed as the proportion of the sum of total mortality plus escapement" (page 63 of the RMP). The co-managers propose that the RMP's rebuilding exploitation rate for the individual management units would improve the viability status of the population or populations within that management unit. The co-managers' intent is to manage fisheries such that harvest rates remain below each management unit's rebuilding exploitation rate (page 13 of the RMP). The co-managers used several methods to derive the RMP's rebuilding exploitation rates, which are explained in more detail within the RMP.

NMFS also established rebuilding exploitation rates for nine individual populations within the ESU and for the Nooksack Management Unit, which is discussed in more detail in the ERD. For individual populations, NMFS has determined that exploitation rates at or below NMFS-derived rebuilding exploitation rates will not appreciably reduce the likelihood of rebuilding that population, assuming current environmental conditions and based on specific risk criteria. The method used by NMFS to derive the rebuilding exploitation rates is described in a document titled "Viable Risk Assessment Procedure" (NMFS 2000a).

The NMFS-derived rebuilding exploitation rates are not the same as the RMP's rebuilding exploitation rates. The co-managers' rebuilding exploitation rates are management-unit-based. Some of the RMP's rebuilding exploitation rates are based on the same risk criteria as those used by NMFS, but other rebuilding exploitation rates proposed in the RMP are based on observed minimum exploitation rates or on harvest ceilings set by the Pacific Salmon Treaty. In addition, NMFS-derived rebuilding exploitation rates are designed to include all fishery-related mortality throughout the migratory range of Puget Sound chinook salmon. The RMP's rebuilding exploitation rates define allowable harvest rates for either total, southern United States (SUS) fisheries, or for pre-terminal southern United States (PT SUS) fisheries only. The RMP's rebuilding exploitation rates may therefore not be directly comparable to NMFS-derived rebuilding exploitation rates.

The SUS fishery is defined in the RMP as all fisheries occurring south of the border with Canada that may harvest listed Puget Sound chinook salmon. In addition to chinook salmon taken within the grater Puget Sound area, chinook salmon harvests encompassed within SUS fisheries would also include listed chinook salmon that may be taken in fisheries off the coast of Washington,

Oregon, and northern California. The SUS fishery includes both pre-terminal and terminal area SUS fisheries. The co-managers define a pre-terminal fishery as a “fishery that harvests significant numbers of fish from more than one region of origin” (page 65 of the RMP). The co-managers define a terminal fishery as a “fishery, usually operating in an area adjacent to or in the mouth of a river, which harvests primarily fish from the local region of origin, but may include more than one management unit. Non-local stocks may be present, particularly in marine terminal areas” (page 65 of the RMP). The terminal SUS fisheries will vary by management unit and may occur in freshwater and marine areas.

Calculating a rebuilding exploitation rate ideally requires knowledge of a spawner-recruit relationship based on escapement, age composition, coded-wire tag distribution, environmental parameters, and an estimate of management error (N. Sands, NMFS, Northwest Fisheries Science Center (NWFSC), pers. com., to K. Schultz, NMFS, March 5, 2003). These types of data are available for several management units. The co-managers calculated rebuilding exploitation rates using this method for the Skagit Summer/Fall, Skagit Spring, Stillaguamish, and Snohomish chinook salmon Management Units.

The co-managers’ expectations are that application of the RMP’s rebuilding exploitation rates will: (1) result in escapement levels that are less than the point of instability² no more than five percent more often than if no harvest had occurred over 25 to 40 years³; *and* (2) lead to a high (at least 80 percent) probability that spawning escapements will increase in 25 or 40 years to a specified (upper) threshold, *or* that the percentage of escapements less than the RMP’s low abundance threshold at the end of 25 or 40 years will differ from a no-harvest regime by less than 10 percent (pages 13 and 14 of the RMP). Appendix A: Management Unit Status Profiles of the RMP provides details on the methods the co-managers used to develop the RMP’s rebuilding exploitation rates, which are based on a spawner-recruit relationship, where data were available.

The data required to calculate a spawner-recruit relationship is not yet available for most Puget Sound chinook salmon populations. For the Lake Washington, Skokomish, and Mid-Hood Canal Management Units, the co-managers generally established the RMP’s rebuilding exploitation rate at the lowest level of exploitation rates observed in the late 1990s (approximately 15 percent pre-terminal SUS). Overall, implementation of these lower exploitation rate levels by the co-

2 The co-managers define the point of instability as “that level of population abundance (i.e., spawning escapement) that incurs substantial risk to genetic integrity, or exposes the stock to depensatory mortality factors” (page 65 of the RMP).

3 Based on co-manager’s expertise and explained in more detail in Appendix A: Management Unit Status Profiles of the RMP. The RMP uses a 25-year projection for the Stillaguamish and Snohomish Management Units in development of the proposed rebuilding exploitation rate. The co-managers used a 40-year projection for the Skagit Summer/Fall and Skagit Spring Management Units.

managers has contributed to stable to increasing spawning escapement trends for populations within these management units.

Impacts associated with terminal fisheries would not be included in the pre-terminal SUS exploitation rate limits set for some Management Units. In response, and similar to recent years, the co-managers propose that terminal area fisheries in the Lake Washington and Mid-Hood Canal Management Units be limited by maximum allowable exploitation rates of less than 5 percent. Under the implementation of the RMP, the Skokomish chinook Management Unit's terminal area fisheries would be managed for an escapement objective. The achievement of the Skokomish Management Unit's chinook salmon escapement objective would dictate the maximum allowable terminal area exploitation rate in a given year.

Terminal area fishery impacts are very low or non-existent for the Dungeness, Elwha, and Western Strait of Juan de Fuca chinook Management Units. Under the proposed RMP, a rebuilding exploitation rate of 10 percent for SUS fisheries would be applied for these three management units. The SUS fisheries limited by the 10 percent rate would include both pre-terminal and terminal area SUS fisheries. Thus, impacts associated with Alaska or Canadian fisheries would not be included in this SUS fishery exploitation rate limitation.

Upper Management Threshold: Table 2 in the ERD document outlines the RMP's upper management thresholds. The co-managers define the upper management threshold as the "escapement level associated with optimum productivity (i.e. maximum sustainable harvest...)" (page 12 of the RMP). The co-managers calculated the RMP's upper management threshold assuming current habitat conditions (page 13 of the RMP). The upper management thresholds proposed in the RMP equate to upper escapement thresholds and defined as targets by the co-managers for each management unit.

The RMP's annual management strategy depends on whether a harvestable surplus is forecast. A management unit is considered to have a harvestable surplus if the spawning escapement is expected to exceed its upper management threshold (page 12 of the RMP). The RMP prohibits directed harvest on listed populations of Puget Sound chinook salmon unless they are shown to have a harvestable surplus. In other words, if a management unit does not have a harvestable surplus, then all harvest-related mortality on chinook salmon in SUS fisheries would be limited to incidental impacts only (page 32 of the RMP).

With an exception, the RMP states that the "projected exploitation rate for management units with no harvestable surplus [and above their lower abundance threshold] would not be allowed to exceed their rebuilding exploitation rate ceiling" (page 33 of the RMP). The exception to this limit is associated with the chinook salmon harvest in Canadian fisheries, which were approved under the Pacific Salmon Treaty. For those management units affected by Canadian fisheries, in

some years the RMP's critical exploitation rate ceiling, rather than the rebuilding exploitation rate ceiling, may be applied as the restraining limit on Puget Sound fisheries. In such instances, the total exploitation rate in that year would exceed the RMP's rebuilding exploitation rate (see discussion of the RMP's critical exploitation rate ceiling below).

The technical basis for the RMP's establishment of upper management thresholds varies among management units (see footnotes on Table 12, page 43 of the RMP). For populations with sufficient information, the co-managers derived upper management thresholds using such methods as standard spawner-recruit calculations (Ricker 1975), empirical observations of relative escapement levels and catches, or Monte Carlo simulations that buffer for error and variability (Hayman 2003). The methods selected for use in deriving thresholds for each management unit are described in Appendix A: Management Unit Status Profiles of the RMP.

Low Abundance Threshold: Table 2 in the ERD document presents the RMP's proposed low abundance thresholds. The co-managers define the low abundance threshold as a "spawning escapement level, set intentionally above the point of biological instability, which triggers extraordinary fisheries conservation measures to minimize fishery related impacts and increase spawning escapement" (page 63 of the RMP).

For specific application in managing fisheries affecting each management unit, the co-managers further defined the low abundance threshold as either: (1) the lowest escapement with a greater than one return per spawner ratio; (2) the forecasted escapement for which there is an "acceptably low" probability that the observed escapement will be below the point of instability (page 15 of the RMP); or (3) in cases where specific data were lacking, the co-managers "derived the RMP's low abundance threshold" in accordance with scientific literature [such as the generic guidelines found in the Viable Salmonid Populations (VSP) paper (NMFS 2000b) or more subjectively, at an annual escapement of 200 to 1,000 fish" (page 15 in the RMP). The method chosen by the co-managers depended on the quality and quantity of population-specific data available (see Appendix A: Management Unit Status Profiles of the RMP).

Critical Exploitation Rate Ceiling: The co-managers established a critical exploitation rate ceiling for all management units with a low abundance threshold (see Table 2 in the ERD document). For most management units, the RMP's critical exploitation rate ceiling imposes an upper limit on SUS exploitation rates when spawning escapement for a management unit is projected to fall below its low abundance threshold, *or* if impacts in Canadian fisheries make it difficult or impossible to achieve the RMP's rebuilding exploitation rate. The RMP's rebuilding exploitation rate, the upper management threshold, and the low abundance threshold discussed above are primarily biologically-driven objectives. The RMP's proposed critical exploitation rate ceilings are primarily driven by policy considerations.

The co-managers propose that the critical exploitation rate ceiling, when imposed on SUS fisheries, would result “in a significant reduction in incidental impacts on listed chinook salmon,” while providing “minimally acceptable access” to non-listed salmon species, including non-listed hatchery chinook salmon, for which harvestable surpluses have been identified (page 15 of the RMP). A general description of these minimal fisheries, as proposed by the co-managers, is outlined in Appendix C: Minimum Fisheries Regime of the RMP.

For the majority of the management units, the RMP’s critical exploitation rate ceilings are defined as an exploitation rate ceiling for the all SUS fisheries. For the Lake Washington, Green, Puyallup, Nisqually, Mid-Hood Canal and Skokomish Management Units, the RMP’s critical exploitation rate ceiling applies only to pre-terminal area SUS fisheries. For these units, the co-managers outline additional terminal area fishery management conservation measures that may be considered (Appendix A: Management Unit Status Profiles and Appendix C: Minimum Fisheries Regime of the RMP).

The RMP’s critical exploitation rate ceilings were established by the co-managers after policy consideration of “recent fisheries regimes that responded to critical status for some management units” (page 17 of the RMP). The co-managers’ position is that if further resource protection is necessary, it must be found by reducing exploitation rates in mixed-stock fisheries in Alaska and Canada, improving habitat conditions, and/or providing hatchery supplementation where necessary and appropriate (page 16 of the RMP). However, where analysis can demonstrate that additional conservation measures in fisheries would contribute substantially to recovery of a management unit, the co-managers may, at their discretion, and in concert with other specific habitat and enhancement actions, implement them (page 34 of the RMP).

Harvest in some coastal fisheries in British Columbia, Canada, has increased recently, approaching the limits agreed to by the United States under Annex IV, Chapter 3, of the Pacific Salmon Treaty. Increased impacts on Puget Sound chinook salmon associated with Canadian fisheries may contribute to total exploitation rates that exceed the proposed RMP’s rebuilding exploitation rate. During preseason planning, if the total exploitation rate for a management unit is projected to exceed the RMP’s rebuilding exploitation rate for a given management unit, the co-managers propose to constrain their fisheries such that either the RMP’s rebuilding exploitation rate is not exceeded *or* the RMP’s critical exploitation rate ceiling is not exceeded. The RMP’s critical exploitation rate ceiling, in this circumstance, would constrain SUS fisheries to the same degree as if the abundance were below the low abundance threshold (page 35 of the RMP). Modeling exercises by the co-managers demonstrate the potential for the total exploitation rate to exceed the RMP’s rebuilding exploitation rate in several management units with the proposed duration of the RMP.

The co-managers, independently and jointly, conduct a variety of research and monitoring programs. The RMP includes implementation, monitoring, and evaluation procedures designed to ensure fisheries are consistent with the RMP's management objectives. Chapter 7 of the RMP describes these procedures, which assess the effectiveness of the management actions in achieving the RMP management objectives. These programs also assess the validity of the assumptions used to derive management objectives. Information collected through these activities will be used in conjunction with proposed fisheries performance indicators to assess the effectiveness of the RMP in meeting its stated objectives.

(2) BIA Funding of Tribal Management, Enforcement, and Monitoring Projects:

The BIA proposes to fund Puget Sound tribes' management, enforcement, and monitoring projects in support of the RMP. Only project funding that may impact listed Puget Sound chinook salmon through April 30, 2010, is considered in this consultation. The co-managers manage Puget Sound fisheries pursuant to the Puget Sound Salmon Management Plan (PSSMP), which establishes guidelines for management of all marine and freshwater salmon fisheries from the Strait of Juan de Fuca eastward. The PSSMP was adopted by court order as a sub-proceeding related to *U.S. v. Washington* Civ. No. C70-9213 (W.D. Wash.) (see 384 F. Supp. 312 (W.D. Wash. 1974)). Puget Sound fisheries harvest all five salmon species. The BIA provides funding to the Puget Sound tribes to support the salmon fishery management programs conducted under the PSSMP. Because the programs that would be funded by the BIA are described in the RMP, NMFS' analysis of the RMP already considers the effects of the proposed funding by the BIA.

(3) USFWS Authorization of Fisheries Proposed in the RMP:

The USFWS proposes to authorize fisheries that are consistent with the implementation of the RMP, as approved under the ESA 4(d) Rule. Only fisheries that may impact listed Puget Sound chinook salmon through April 30, 2010, are considered in this consultation. The USFWS, the State of Washington, and the treaty tribes within the Hood Canal, are parties to the Hood Canal Salmon Management Plan (HCSMP). The HCSMP is a regional management plan, which stipulates orders related to the PSSMP. All salmon species originating in Hood Canal, including listed chinook salmon, are managed under the HCSMP. Any change in management objectives under the HCSMP requires authorization by the USFWS, as a party to the plan. Because USFWS would consider for authorization only those fisheries consistent with the RMP, the analysis of the RMP includes and fully represents effects of the USFWS action under the HCSMP.

Each of these three actions requires consultation with NMFS because the Federal agency (NMFS, BIA, or USFWS) is funding or authorizing actions that may adversely affect listed salmon (section 7(a)(2) of the ESA).

1.4 Action Area

The action area for this Biological Opinion (referred hereafter as the Puget Sound Action Area) encompasses the area included in the Puget Sound Chinook Salmon ESU, as well as the western portion of the Strait of Juan de Fuca within the United States (see Figure 1 in the ERD).

1.5 Status of the Species and Critical Habitat

Species Affected: With respect to salmonids, only impacts on listed Puget Sound chinook salmon are addressed in this Biological Opinion. However, leatherback sea turtles (*Dermochelys coriacea*), Steller sea lions (*Eumetopias jubatus*), and humpback whales (*Megaptera novaeangliae*) are also listed under the ESA under NMFS' jurisdiction, and these species may occur in Puget Sound. Leatherback sea turtles use of inland Washington waters is accidental at best; and therefore, this species is unlikely to interact with Puget Sound salmon fisheries (B. Norberg, NMFS, per. comm. with S. Bishop, NMFS, May 6, 2004). The Marine Mammal Protection Act of 1972 (MMPA) requires all commercial fisheries to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals in each fishery. Every year, NMFS reviews and revises its list of fisheries based on new information. These categories are:

- (1) Category I designates fisheries with frequent serious marine mammal injuries and mortalities incidental to commercial fishing;
- (2) Category II designates fisheries with occasional serious marine mammal injuries and mortalities; and
- (3) Category III designates fisheries with a remote likelihood or no known serious marine mammal injuries or mortalities.

For 2003, only the Washington Puget Sound salmon drift gillnet fishery has been designated by NMFS as a Category II fisheries (68 FR 41725, July 15, 2003). All other Puget Sound salmon fisheries were identified as meeting the Category III designation. No ESA-listed marine mammal species were documented to have been killed or caught and released in any salmon fishery in Puget Sound (68 FR 1414, January 10, 2003). Therefore, because these fisheries are not likely to adversely affect ESA-listed marine mammals, effects on listed marine mammals will not be discussed further in this Biological Opinion.

Current Status: For the reasons stated above, the remainder of this Biological Opinion will be restricted to addressing the effects of the proposed Federal actions on Puget Sound chinook salmon.

On March 24, 1999, NMFS listed Puget Sound chinook salmon, both naturally-produced and selected artificially propagated populations, as a threatened species (64 FR 14308, March 24, 1999). The ESU encompasses all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound, including the Straits of Juan de Fuca from the Elwha River eastward, and rivers and streams flowing into Hood Canal, South Sound, North Sound, and the Strait of Georgia in Washington. NMFS also listed chinook salmon and their progeny from the following hatchery stocks because they were considered essential to the recovery of the ESU: Kendall Creek; North Fork Stillaguamish River; White River; Dungeness River; and Elwha River.

Since the 1999 listing, NMFS has conducted a series of reviews of the status of West Coast populations of Pacific salmon and steelhead with respect to the ESA (West Coast Salmon Biological Review Team 2003). This ESU status review updates were undertaken to allow consideration of new data that accumulated over the various time periods since the last updates and to address issues raised in recent court cases regarding the ESA status of hatchery fish and resident (non-anadromous) populations. By statute, ESA listing determinations must take into consideration not only the best scientific information available, but also those efforts being made to protect the species. As in the past, the Biological Review Team (BRT) used a risk-matrix method to quantify risks in different categories within each ESU. In the current review, the method was modified to reflect the four major criteria identified in the VSP document (McElhany *et al.* 2000): abundance, growth rate/productivity, spatial structure, and diversity. Based on the criterion of self-sustainability, the majority BRT conclusion was that the Puget Sound Chinook Salmon ESU was “likely to become endangered in the foreseeable future.” The current status of the Puget Sound Chinook Salmon ESU is threatened. The term threatened species is defined as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Abundance and Distribution: The March 24, 1999 (64 FR 14308) listing determination and supporting species status reviews (NMFS 1998a; NMFS 1998b), along with subsequent status reviews (West Coast Salmon Biological Review Team 2003), provides relevant and recent information regarding the ESU’s distribution, trend, and status. As reported by NMFS (1998b), based on the estimated total Puget Sound commercial catch extrapolated from cannery pack statistics in 1908 (when both ocean harvest and hatchery production were negligible), Bledsoe *et al.* (1989) proposed an historical abundance of 670,000 chinook salmon in this ESU. This estimate of historical Puget Sound chinook salmon population size should be viewed cautiously. The statistic on which this estimate is based, the 1908 Puget Sound cannery pack, probably included an unknown proportion of fish landed at Puget Sound ports that originated from areas outside of Puget Sound. It is also likely that the cannery pack that year represented only a portion of the total catch.

The Puget Sound Technical Recovery Team (TRT) has completed a preliminary analysis of the population structure of chinook salmon within the Puget Sound Chinook Salmon ESU. The TRT is an independent scientific body convened by NMFS to develop technical delisting criteria and guidance for salmon recovery planning in Puget Sound.

The proposed RMP's delineation of populations within the ESU is the same as those preliminarily recognized by the Puget Sound TRT. The TRT reviewed several sources of information in deriving the preliminarily recognized delineations. These sources of information include geography, migration rates, genetic attributes, patterns of life history and phenotypic characteristics, population dynamics, and environmental and habitat characteristics of potential populations (NMFS 2004b). The TRT has identified 22 demographically independent populations within the ESU, representing the primary historical spawning areas of chinook salmon (PSTRT 2003). Recent year annual escapement estimates for chinook populations within the ESU are provided in Table 6 of the ERD document.

To assist in analyzing the impacts of the co-managers' proposed fisheries management actions, the RMP categorizes each chinook salmon population according to the population's life history and production characteristics. The co-managers used this method to assign populations to one of three possible watershed based categories:

Category 1 - Category 1 watersheds are areas where populations are genetically unique and indigenous to Puget Sound. Maintaining genetic diversity and integrity, and achieving abundance levels for long-term sustainability are the highest priorities for these populations. The management objective for Category 1 populations is to protect and recover these indigenous populations. The intent is to rebuild and manage for natural production. The co-managers propose to manage fisheries to meet interim escapement goals and/or the rebuilding exploitation rates for Category 1 populations based on the co-managers' understanding of natural chinook salmon production requirements for each population. The co-managers designated 17 of the 22 populations within the ESU as Category 1 (see Table 7 in the ERD document).

The status of Category 1 populations within the ESU varies. Some populations have fallen to such low levels that the ability to maintain their genetic diversity may be at risk. In some cases, lacking hatchery operations, populations would likely decline to very low levels or go extinct. In one case at least, the number of hatchery-origin fish spawning naturally may be a concern, in part because it may be masking the ability to evaluate the actual productivity of the natural-origin population. Other populations are more robust and the abundance levels are above what is needed to sustain genetic diversity, but often not at levels that will sustain maximum yield.

Category 2 - Category 2 watersheds are areas where indigenous populations are believed to no longer exist, but where sustainable wild populations existed historically. The co-managers believe that self-sustaining natural production is possible in Category 2 watersheds given suitable or productive habitat. Five Category 2 populations within the ESU have been identified by the co-managers (see Table 7 in the ERD document).

Category 2 populations are primarily found in southern Puget Sound and Hood Canal where hatchery production has been used extensively to mitigate for natural production lost to habitat degradation. Historically, these areas were managed for hatchery production. Consequently, in many of these systems, hatchery and natural fish are currently indistinguishable on the spawning grounds. In the future, on-going mass marking programs implemented at regional hatcheries will provide a means to distinguish between hatchery-origin and natural-origin adult chinook salmon upon return to their watersheds of origin. Given degraded habitat conditions within these watersheds, the co-managers' goal of harvest management is to provide sufficient escapement to the spawning grounds to increase natural productivity. Future decisions regarding the form and timing of recovery efforts in these watersheds will dictate the kinds of harvest actions that may be necessary and appropriate.

The co-managers have assigned populations to Category 2 based on current information. Ongoing monitoring and studies may identify remnant indigenous populations, which if found, may cause the population to be reassigned to Category 1. Decisions by the TRT about roles of these populations in the ESU may also require the populations to be re-categorized. The RMP includes monitoring and evaluation elements that will assist the TRT in these decisions. Additionally, the co-managers recognize that there is ongoing work by the TRT and other resource agencies or organizations that may also affect future harvest actions.

Category 3 - Category 3 watersheds are where populations are generally found in small tributaries that may now have some natural spawning, but never historically had independent, self-sustaining populations of chinook salmon. Consistent with the TRT guidance, these small tributary spawning aggregations characteristic of Category 3 watersheds do not meet criteria necessary for the aggregations to be identified as independent populations. Several Category 3 watersheds were identified in the 2001 RMP (PSIT and WDFW 2001). However, similar to the 2003 RMP (PSIT and WDFW 2003), the proposed RMP evaluated in this Biological Opinion does not identify or establish management objectives for any Category 3 watersheds. Instead, this RMP focuses on management of populations in Category 1 and Category 2 watersheds. These watersheds harbor all of the 22 chinook salmon independent populations delineated as extant by the Puget Sound TRT

Chinook salmon population escapement trends were also considered by NMFS in evaluating and determining the extinction risk status of the Puget Sound Chinook Salmon ESU. Declining

escapement trends for most chinook salmon populations in the region helped lead NMFS to list the ESU as a threatened species in March, 1999. A general post-listing assessment of each population's escapement trend as either decreasing, remaining stable or increasing since the time of listing can be made by comparing the 1999 to 2002 average escapement with the 1990 to 1998 average escapement (see Table 8 in the ERD document). The following system was used to determine the trend of the populations:

Increasing - The trend of a population was considered increasing if the difference in the 1999 to 2002 average escapement was greater than 10 percent above the pre-listing 1990 to 1998 average escapement;

Decreasing - The trend of a population was considered decreasing if the difference in the 1999 to 2002 average escapement was less than 10 percent below the pre-listing 1990 to 1998 average escapement; and

Stable - The trend of a population was considered stable if the difference in the 1999 to 2002 average escapement was within 10 percent of the pre-listing 1990 to 1998 average escapement.

Based on criteria described above, all populations were determined to have a stable (six populations) to increasing (16 populations) trend in escapement (see Table 9 in the ERD document).

1.6 Environmental Baseline

Environmental baselines for biological opinions are defined by regulation at 50 CFR 402.02, which states that an environmental baseline is the physical result of all past and present state, Federal, and private activities in the action area along with the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early consultation under section 7 of the ESA. The environmental baseline for this Biological Opinion is therefore the result of the impacts that many activities (summarized below) have had on the likelihood for the survival and recovery of Puget Sound chinook salmon.

In general, a wide variety of factors have contributed to the decline of chinook salmon populations in the Puget Sound area. In some cases, activities identified at the time of listing as factors for decline have received increasing attention, and their effects are being reduced. However, the most pervasive risks to improved status of listed salmon require long and difficult efforts to correct, and many actions geared towards reducing likelihood of extinction still require relatively long periods of time for their positive effects to become noticeable.

Human-Induced Habitat Degradation: Although some types of fishing gear used in the marine environment, such as bottom trawls, are known to have habitat impacts, these gears are not used in the salmon fisheries considered here. Bishop and Morgan (1996), identified a variety of habitat issues for streams in the range of this ESU resulting from urbanization, forest, and agricultural practices including (1) changes in flow regime (all basins), (2) sedimentation (all basins), (3) high temperatures (Dungeness, Elwha, Green/Duwamish, Skagit, Snohomish, and Stillaguamish Rivers), (4) streambed instability (most basins), (5) estuarine loss (most basins), (6) loss of large woody debris (Elwha, Snohomish, and White Rivers), (7) loss of pool habitat (Nooksack, Snohomish, and Stillaguamish Rivers), and (8) blockage or passage problems associated with dams or other structures (Cedar, Elwha, Green/Duwamish, Snohomish, and White Rivers). The above activities and habitat modifications have greatly degraded extensive areas of salmon spawning and rearing habitat in the Puget Sound.

NMFS has not completely analyzed the role of habitat loss and degradation in contributing to the decline of Puget Sound salmon, and how recovery of the ESU might benefit from any proposed protective or restoration strategies. Specifically, NMFS is unable at this time to quantify improvements in salmon survival productivity that should result from improvements in habitat conditions. It is reasonable to expect, however, that improvements in land management on state, Federal, and private land within the Puget Sound will result in improved overall survival for listed chinook salmon considered in this Biological Opinion.

Hatcheries: Fall-, summer-, and spring-run chinook salmon stocks are artificially propagated through 42 programs in Puget Sound. Currently, the majority of chinook salmon hatchery programs produce fall-run (also called summer/fall) stocks for fisheries harvest augmentation purposes. Captive broodstock and supplementation programs implemented as conservation measures to recover early returning chinook salmon operate in the White River (Appleby and Keown 1994) and the Dungeness River watersheds (Smith and Sele 1995). Conservation-directed supplementation programs currently exist for spring-run chinook salmon on North Fork Nooksack River and for summer-run chinook salmon on the North Fork Stillaguamish and Elwha Rivers (Fuss and Ashbrook 1995; NMFS 1998a).

Hatchery-origin fish may potentially pose risks to naturally-produced salmon and steelhead in four primary ways: (1) ecological effects, (2) genetic effects, (3) harvest effects, and (4) masking effects (NMFS 2000c). Ecologically, hatchery fish can prey upon, displace, and compete with wild fish for food and rearing space as juveniles. These risks to natural-origin fish may be highest in freshwater areas after the hatchery-origin juvenile fish are released. The risk of effects on the natural-origin fish likely diminish as the hatchery fish disperse seaward downstream. If carrying fish disease pathogens, released hatchery fish may transmit those pathogens to natural-origin fish when the fish intermingle in natural areas. If present in the hatchery, fish disease pathogens may also be transmitted to natural-origin fish rearing downstream of hatcheries in

hatchery effluent. Hatchery fish can potentially affect the genetic composition of native fish that are genetically dissimilar by interbreeding with them.

There is currently a shift occurring in hatchery management from augmenting harvest to restoring, maintaining and conserving natural populations of anadromous salmonids (NMFS 2002b). Within the last decade, hatchery programs have responded to the ESA listings and the continuing declines in natural populations by shifting to conservation programs (Flagg and Nash 1999). The goals of conservation programs are to restore and maintain natural populations. The change to conservation-type hatchery programs has followed a general call for hatchery reform within the Pacific Northwest. The changes proposed are to ensure that existing natural salmonid populations are preserved, and that hatchery-induced genetic and ecological effects on natural populations are minimized.

Hatchery programs in the Pacific Northwest are in the process of phasing out use of dissimilar broodstocks, such as out-of-basin or out-of-ESU stocks, replacing them with fish derived from, or more compatible with, locally adapted populations. Producing fish that are better suited for survival in the wild is now an explicit objective of many salmon hatchery programs. Hatchery programs are also incorporating improved production techniques, such as NATURES-type rearing protocols⁴ and limits on the duration of conservation hatchery programs.

Harvest: In the past, fisheries in Puget Sound were generally not managed in a manner appropriate for the conservation of naturally spawning chinook salmon populations. Fisheries exploitation rates were in most cases too high in light of the declining productivity of natural chinook salmon stocks. Additionally, high exploitation rates directed at hatchery stocks caused many natural stocks to fail to meet natural escapement goals in some years.

The co-managers implemented several strategies to manage fisheries to reduce harvest impacts in recent years and to implement harvest objectives that are consistent with the underlying production of the natural population. Time and area closures are implemented to reduce catches of weak stocks and to reduce chinook by-catch in other fisheries. Other regulations, such as size limits, bag limits, and requirements for the use of barbless hooks in all recreational fisheries are also used.

⁴ A fundamental assumption is that improved rearing technology will reduce environmentally induced physiological and behavioral deficiencies presently associated with cultured salmonids. Enriched (NATURES) rearing environments hold promise for improving hatchery rearing technology. NATURES-type rearing protocols includes a combination of underwater feed-delivery systems, submerged structure, overhead shade cover, and gravel substrates, which have been demonstrated in most studies to improve instream survival of chinook salmon (*O. tshawytscha*) smolts during seaward migrations.

Natural Conditions: The declines in fish populations in Puget Sound in the 1980s and into the 1990s may reflect broad-scale shifts in natural limiting conditions, such as increased predator abundances and decreased food resources in ocean rearing areas. NMFS has noted that predation by marine mammals has increased as marine mammal numbers, especially harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*) increase on the Pacific Coast (NMFS 1998a). In addition to predation by marine mammals, Fresh (1997) reported that 33 fish species and 13 bird species are predators of juvenile and adult salmon, particularly during freshwater rearing and migration stages.

Changes in climate and ocean conditions happen on several different time scales and have had a profound influence on distributions and abundances of marine and anadromous fishes. Recent evidence suggests that marine survival among salmonids fluctuates in response to 20- to 30-year cycles of climatic conditions and ocean productivity. Although recent climatic conditions appear to be within the range of historical conditions, the risks associated with climatic changes are probably exacerbated by human activities (Lawson 1993).

Scientific Research: Puget Sound chinook salmon, like other ESA-listed fish, are the subject of scientific research and monitoring activities. Most biological opinions issued by NMFS have conditions requiring specific monitoring, evaluation, and research projects to gather information to aid the preservation and recovery of listed fish.

The impacts of these research activities pose both benefits and risks to the listed species. In the short-term, a limited number of fish are harassed and even killed in the course of scientific research; however, these activities have a great potential to benefit to ESA-listed species in the long-term. Most importantly, the information gained during research and monitoring activities will assist in planning for the recovery of listed species.

1.7 Effects of the Proposed Action

In its biological opinions, NMFS analyzes the effects of proposed Federal actions, as defined in 50 CFR 402.02, to determine whether the actions are likely to jeopardize the continued existence of the affected listed ESUs or result in the destruction or adverse modification of designated critical habitat. NMFS considers the estimated level of injury or mortality attributable to the collective effects of the action and any cumulative effects and then determines the impact on species abundance and distribution. NMFS also evaluates whether the action directly or indirectly is likely to destroy or adversely modify designated critical habitat for listed species.

The co-managers, in cooperation with NMFS, have modeled the anticipated impacts of the implementation of the RMP. Table 3 in the ERD document indicates the anticipated range of exploitation rates and anticipated escapements for Puget Sound chinook salmon over the

duration of the RMP implementation period. Two variables were used in the modeling the effects of future fisheries to provide these anticipated ranges of exploitation rates and anticipated escapements. These variables were abundance of returning salmon and impacts associated with Canadian fisheries. These variables are discussed in more detail in the ERD.

No critical habitat is designated for the Puget Sound Chinook Salmon ESU. Therefore, the proposed Federal sub-actions will not directly or indirectly destroy or adversely modify this ESU's critical habitat. However, in the absence of designated critical habitat for Puget Sound chinook salmon, it is still pertinent to evaluate the effects of the proposed action on the listed species' habitat to determine whether those actions are likely to jeopardize the species' continued existence. As described in the attached NMFS' Magnuson-Stevens Fishery Conservation and Management Act essential fish habitat consultation, fisheries consistent with the RMP are not expected to adversely affect EFH for Pacific salmon.

1.8 Cumulative Effects

Cumulative effects, defined in 50 CFR 402, include the effects of future state, tribal, local, or private actions not involving Federal activities that are reasonably certain to occur within the action area of the Federal action subject to this consultation. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Non-Federal actions that require authorization under other sections of the ESA, and not included here, will be considered in separate section 7 consultations. Non-Federal actions such as actions taken by state, tribal and local governments will likely to be in the form of legislation, administrative rules or policy initiatives. Government and private actions may include changes in land and water uses, including ownership and intensity, any of which could impact listed species or their habitat. Government actions are subject to political, legislative and fiscal uncertainties. These realities, added to the geographic scope of the action area which encompasses numerous government entities exercising various authorities and the many private landholdings, make any analysis of cumulative effects difficult and speculative.

Representative State Actions - The Washington state government is cooperating with other governments to increase environmental protection for listed salmon ESUs through development and implementation of habitat restoration, hatchery and harvest reform, and water resource management actions. The following list of major efforts and programs, described in the Summer Chum Salmon Conservation Initiative (WDFW and PNPTC 2000), are directed at or are contributing to the recovery of Puget Sound chinook salmon:

- Washington Wildlife and Recreation Program
- Wild Stock Restoration Initiative

- Joint Wild Salmonid Policy
- Hood Canal Coordinating Council
- Governor's Salmon Recovery Office
- Conservation Commission Watershed Limiting Factors Analyses
- Salmon Recovery Lead Entities
- Salmon Recovery Funding Board
- Forest and Fish Report
- Growth Management Act

There are other proposals, rules, policies, initiatives, and government processes that help conserve marine resources in the Puget Sound, improve the habitat of listed species, and assist in recovery planning. As with the above state initiatives, these programs could benefit the listed species if implemented and sustained.

In the past, Washington State's economy was heavily dependent on natural resources, with intense resource extraction activity. Changes have occurred in the last decade, and the region is likely to continue with less large scale resource extraction, more targeted extraction methods, and substantial growth in other economic sectors. Growth in new businesses is creating urbanization pressures and has contributed to population growth and movement in the Puget Sound area, a trend likely to continue for the next few decades. Such trends will place greater demands in the action area for electricity, water and build-able land; will affect water quality directly and indirectly; and will increase the need for transportation, communication and other infrastructure development. These impacts will affect habitat features, such as water quality and quantity, which are important to the survival and recovery of the listed species. The overall effect on listed salmon survival and productivity is likely to be negative, unless carefully planned for and mitigated through the initiatives and measures described above.

Local Actions: Local governments will be faced with similar but more direct pressures from population increases and attendant activities. There will be demands for intensified development in rural areas as well as increased demands for water, municipal infrastructure and other resources. The reaction of local governments to such pressures is difficult to assess at this time without certainty in policy and funding. In the past, local governments in the action area generally have accommodated additional growth in ways that adversely affected listed fish habitat, allowing for development to destroy wetlands, stream-banks, estuarine shorelines, and other areas critical to listed species.

Some local government programs, if submitted for consideration, may qualify for a limit under the ESA section 4(d) rule, which is designed to conserve listed species. Local governments also may participate in regional watershed health programs, although political will and funding will determine participation and therefore the effect of such actions on listed species. Overall, without comprehensive and cohesive beneficial programs and the sustained application of such

programs, it is likely that local actions will have few measurable positive effects on listed species and their habitat, and may even contribute to further degradation.

Tribal Actions: Tribal governments participate in cooperative efforts involving watershed and basin planning designed to improve fish habitat and are expected to continue to do so. The results from changes in tribal forest and agriculture practices, water resource allocations, and land uses are difficult to assess for the same reasons discussed under State and Local Actions. The earlier discussions related to growth impacts apply also to tribal government actions. Tribal governments will need to apply comprehensive and beneficial natural resource programs to areas under their jurisdiction to produce measurable positive effects for listed species and their habitat.

Private Actions: The effects of private actions on ESA-listed resources are the most uncertain. Private landowners may convert current use of their lands, or they may intensify or diminish current uses. Individual landowners may voluntarily initiate actions to improve environmental conditions, or they may abandon or resist any improvement efforts. Their actions may be compelled by new laws, or may result from growth and economic pressures. Changes in ownership patterns will have unknown impacts.

Summary: Non-federal actions are likely to continue affecting listed species. The cumulative effects of these actions are difficult to analyze considering the geographic landscape of the action area for this Biological Opinion, the uncertainties associated with government and private actions, and the changing economies of the region. Whether effects associated with these actions will increase or decrease is a matter of speculation; however, based on the trends identified in this section, the adverse cumulative effects on listed salmon are likely to increase. Although Tribal, state, and local governments have developed plans and initiatives to benefit listed fish, they must be applied and sustained in a comprehensive way before NMFS can consider them “reasonably foreseeable” in its analysis of cumulative effects.

1.9 Integration and Synthesis of Effects

The Puget Sound TRT is in the process of developing recommended recovery biological criteria for listed salmonids in the Puget Sound region. The TRT has prepared a draft document that includes general guidelines for assessing recovery efforts across individual populations within Puget Sound and determining whether they are sufficient for delisting and recovery of the listed ESU (NMFS 2002a). The preliminary delisting and recovery criteria recommendation provided by the TRT (see Chapter 3 in NMFS 2002a) have been used to assist in the evaluation of the harvest management strategy of the RMP.

Although component populations contribute fundamentally to the structure and diversity of the ESU, it is the ESU, not an individual population, which is the listed species under the ESA. The TRT is charged with identifying the biological characteristics of a recovered ESU as part of developing delisting and recovery criteria. These biological characteristics are based on the

collective viability of the individual populations, their characteristics, and their distributions throughout the ESU.

The geographical distribution of viable populations across the Puget Sound Chinook Salmon ESU is important for the ESU's recovery (NMFS 2002a). The TRT has identified five geographic regions (see Figure 7 in the ERD) within the Puget Sound Chinook Salmon ESU based on similarities in hydrographic, biogeographic, and geologic characteristics, which also correspond to regions where groups of populations could be affected similarly by catastrophes (volcanic events, earthquakes, oil spills, etc.). An ESU with well-distributed viable populations avoids the situation where populations succumb to the same catastrophic risk(s), allows for a greater potential source of diverse populations for recovery in a variety of environments (i.e., greater options for recovery), and will increase the likelihood of the ESU's survival in response to rapid environmental changes, such as an volcanic event. Geographically diverse populations in different regions also distribute the ecological and ecosystem services provided by salmon across the ESU.

The TRT recommends that an ESU-wide recovery scenario should include at least two to four viable chinook salmon populations in each of the five geographic regions within Puget Sound, depending on the historical biological characteristics and acceptable risk levels for populations within each region (NMFS 2002a). An ESU-wide recovery scenario should also include within each of these geographic regions one or more viable populations from each major genetic and life history group historically present within that geographic region (NMFS 2002a). While changes in harvest alone cannot recover the Puget Sound Chinook Salmon ESU, NMFS can use the preliminary TRT guidance for assistance in evaluating whether the proposed RMP would impede recovery and survival of the ESU.

The following risk assessment is presented in two stages. In the first stage, a potential area of concern or risk is identified by region. In the second stage, the likelihood of that concern or risk occurring is evaluated. The assessment in the second stage also considers the practical influence harvest may have on the potential concern or risk.

Estimated impacts from the fisheries proposed by the RMP will vary by region, consistent with population-specific management objectives specified in the RMP. In the ERD, NMFS evaluated the RMP's impacts on individual populations. Consistent with the TRT's guidance to assess ESU-wide effects, the following is an evaluation of the estimated impacts on the ESU, by region, from the fisheries proposed by the RMP:

Georgia Strait Region – Chinook salmon originating from the Georgia Strait Region are distinct from other Puget Sound chinook salmon in their genetic attributes, life history traits, and habitat characteristics (PSTRT 2003). There are two populations within the Georgia Strait Region: the North Fork Nooksack River and the South Fork Nooksack River populations (see Figure 7 in the ERD). Both populations are designated as Category 1 populations (see Table 7 in the ERD).

Straying between the two populations was historically low, as supported by available genetic data, but straying may have increased in recent years (PSTRT 2003). The more recent straying observations may be partially due to an increase in hatchery production. This potential source of straying may have been reduced by the co-managers with the implementation of a 50 percent reduction in on-station hatchery releases from Kendall Creek Hatchery (T. Scott, WDFW, e-mail to K. Schultz, NMFS, March 22, 2004). Habitat differences between the two populations exist, but are subtle (PSTRT 2003).

In the ERD, NMFS has evaluated the RMP's impacts on individual populations and identified an elevated level of risks to the North Fork Nooksack River and South Fork Nooksack River populations, when compared to NMFS' standards. A summary of the risk analysis for these two populations follows. A more detailed analysis of risks to these populations is provided in the ERD.

Nooksack River Populations - The North Fork Nooksack River natural-origin population has exhibited an increasing escapement trend since listing (see Table 9 in the ERD). However, the estimated 1999 to 2002 average escapement of 180 natural-origin spawners for the North Fork Nooksack River population is below the NMFS-derived critical threshold of 200 fish (see Table 8 in the ERD). The South Fork Nooksack River natural-origin population has also exhibited an increasing escapement trend since listing (see Table 9 in the ERD). The 1999 to 2002 average escapement of 249 natural-origin spawners for the South Fork Nooksack River population is slightly above the NMFS-derived critical threshold of 200 fish (see Table 8 in the ERD).

In NMFS' preliminary findings, the broodstock used for the Kendall Creek Hatchery program, located on the North Fork Nooksack River, retains the genetic characteristics of the original, donor, wild population and is considered essential for the survival and recovery of the ESU. When including Kendall Creek hatchery-origin fish, an average aggregate escapement of 3,438 natural spawners in the North Fork Nooksack River has been observed since listing (see Table 10 in the ERD). Adult fish produced by the Kendall Creek Hatchery program and migrating with the natural-origin fish are expected to buffer harvest-induced genetic and demographic risks to the natural-origin North Fork Nooksack River population (see discussion on pages 28 and 29 in the ERD).

Increased escapement of natural-origin fish into the Nooksack River in recent years may be due, in part, to harvest reductions. However, the abundance trend in the natural-origin returns suggests that, although escapement may be stable or even trend upward toward or above the optimum level associated with current habitat condition, natural-origin recruitment will not increase much beyond that level unless constraints limiting marine, freshwater, and estuary survival are alleviated. Augmentation of these natural-origin spawners on the natural spawning areas of the North Fork Nooksack River, with the addition of hatchery-origin spawners, will continue to test the natural production potential of the system at higher escapement levels. The

escapement of hatchery-origin fish may also benefit the natural-origin production by capitalizing on favorable survival conditions in some years.

For the Nooksack Management Unit, the anticipated range of total exploitation rates is 20 to 26 percent. The most likely total exploitation rate within this range is 25 percent (see Table 14 in the ERD). Similar to recent years, the largest proportion of the total exploitation rate is expected to be accounted for by the Canadian fisheries (see Table 4 in the ERD). The SUS exploitation rate on the Nooksack River populations is not anticipated to exceed 7 percent under the proposed RMP (see Table 3 in the ERD). Even if the entire SUS exploitation rate on Nooksack River populations of 7 percent was eliminated, the NMFS-derived rebuilding exploitation rate of 12 percent for the Nooksack Management Unit would still not be achieved.

NMFS has evaluated the elevated risks to the Nooksack Management Unit associated with the SUS fisheries proposed in the RMP, using the NMFS-derived rebuilding exploitation rate as the standard for comparison. With the modeled Canadian fisheries, and assuming 2003 abundance, a 7 percent SUS fishery exploitation rate for the Nooksack River populations would lead to a 2 percentage point decrease in the probability of rebuilt populations in 25 years under current conditions. Modeling also suggests that the application of a 7 percent SUS fishery exploitation rate would result in a 14 percentage point increase in the probability that the populations will fall below the critical level during that same 25-year period (see Table 16 in the ERD).

Similar to recent years, it is likely that the vast majority of the SUS fishery harvest impacts on the Nooksack Management Unit populations under the RMP would occur in treaty Indian fisheries. Since 2001, the majority of the SUS harvest on the Nooksack Management Unit has occurred in tribal fisheries. In recognition of tribal management authority and the Federal government's trust responsibility to the tribes, NMFS is committed to considering their judgment and expertise regarding the conservation of trust resources. Consistent with this commitment and as a matter of policy, NMFS has sought, where there is appropriate tribal management, to work with tribal managers to provide limited tribal fishery opportunities, so long as the risk to the population remains within acceptable limits.

Trends in the escapement of natural-origin Nooksack early chinook salmon populations are increasing. The additional contributions of hatchery origin spawners to the natural spawning areas are anticipated to reduce catastrophic and demographic risks to the North Fork Nooksack population. In addition, the Kendall Creek hatchery-origin chinook salmon shares the ecological and genetic characteristics of the natural origin spawners. Information suggests that past harvest constraints have had limited effect on increasing the escapement of returning natural-origin fish. The magnitude of Canadian harvest is expected to significantly exceed the NMFS-derived rebuilding exploitation rate for the Nooksack River populations. However, the SUS exploitation rate on the Nooksack River populations is not anticipated to exceed 7 percent. NMFS considers the tribes' management authority, judgment, and expertise regarding conservation of trust resources. Taking all these factors into account, NMFS concludes that the implementation of the

RMP from May 1, 2005 through April 30, 2010, will adequately protect chinook salmon populations in the Georgia Straight Region.

North Puget Sound Region – The largest river systems in Puget Sound are found within the North Puget Sound Region. There are ten chinook salmon populations delineated by the TRT within the North Puget Sound Region (see Figure 7 in the ERD). NMFS has determined that the RMP will contribute to the rebuilding of seven of the ten populations (70 percent) within this region. NMFS has identified a potential elevated level of risk under the RMP for three of these ten populations, as assessed through a comparison of likely exploitation rate ranges for these populations under the RMP with their NMFS-derived rebuilding exploitation rates. These three populations are the lower Sauk River and lower Skagit River populations in the Skagit Summer/Fall Management Unit, and the Skykomish River population in the Snohomish Management Unit. A summary of the risk analysis for these three populations follows, but a more detailed analysis is provided in the ERD.

Lower Skagit River Population: The lower Skagit River population is classified as a Category 1 population (see Table 7 in the ERD). The population has shown an increasing escapement trend since listing (see Table 9 in the ERD). The 1999 to 2002 average escapement of 2,944 fish has been above the NMFS-derived viable threshold of 2,182 fish for the lower Skagit River population (see Table 8 in the ERD). The anticipated escapement under the implementation of the RMP for the lower Skagit River population is 1,182 fish (see Table 5 in the ERD). This level of escapement is well above the NMFS-derived critical threshold of 251 fish for the lower Skagit River population.

The anticipated total exploitation rate under the implementation of the RMP for the lower Skagit River population would range between 48 and 56 percent. The most likely total exploitation rate within this range would be 55 percent (see Table 14 in the ERD). The upper end of the range of anticipated total exploitation rates exceeds the NMFS-derived rebuilding exploitation rate of 49 percent for this population. Similar to recent years, it is anticipated that Canadian fisheries will account for the substantial portion of the anticipated total exploitation rate on this population under the implementation of the RMP (see Table 4 in the ERD).

The anticipated range of exploitation rates for the SUS fisheries for the lower Skagit River population is 16 to 18 percent (see Table 3 in the ERD). The most likely exploitation rate for the SUS fisheries within this range is 16 percent (see Table 5 in the ERD). Through modeling, NMFS assessed the increased risk to the lower Skagit River population associated with the SUS fisheries proposed in the RMP. With the modeled Canadian fisheries and abundance similar to 2003 levels, a 16 percent SUS exploitation rate would result in a 26 percentage point decrease in the probability of a rebuilt population in 25 years under current conditions. This modeling also indicates that there is no change in the probability that the population will fall below the critical level during that same 25-year period (see Table 16 in the ERD).

Lower Sauk River Population: The lower Sauk River chinook salmon population is classified as a Category 1 population (see Table 7 in the ERD). The population has exhibited an increasing escapement trend since listing (see Table 9 in the ERD). The 1999 to 2002 average escapement of 721 fish has been above the NMFS-derived viable threshold of 681 fish for the lower Sauk River population (see Table 8 in the ERD). The most likely escapement resulting from the implementation of the RMP for the lower Sauk River population is 588 fish (see Table 5 in the ERD). This level of escapement is above the NMFS-derived critical threshold of 200 fish defined for the lower Sauk River population (see Table 8 in the ERD).

Total exploitation rates on the lower Sauk River population under the implementation of the RMP on the lower Sauk River population are expected to range between 48 and 56 percent. The most likely total exploitation rate within this range is 55 percent (see Table 14 in the ERD). The upper end of the range of anticipated total exploitation rates exceeds the NMFS-derived rebuilding exploitation rate for this population of 51 percent. A lack of data prevented NMFS from determining the level of increased risk for the lower Sauk River population in the event that the total exploitation rate exceeds the NMFS-derived rebuilding exploitation rate. The effects of the implementation of the RMP on the lower Sauk River population are assumed to be similar to those identified for the lower Skagit River population as discussed above.

Skykomish River Population: The Skykomish River chinook salmon population is classified as a Category 1 population (see Table 7 in the ERD). The population has exhibited an increasing escapement trend since listing (see Table 9 in the ERD). The 1999 to 2002 average escapement of 2,118 fish for the Skykomish River population has been above the NMFS-derived critical threshold of 1,650 fish, but below the NMFS-derived viable threshold of 3,500 fish (see Table 8 in the ERD). The estimated escapement for the Skykomish River population that is most likely to result from the implementation of the RMP is 2,385 fish (see Table 5 in the ERD).

The total exploitation rate of 22 percent that is most likely to result from the implementation of the RMP would exceed the NMFS-derived rebuilding exploitation rate for the Skykomish River population by 5 percentage points (see Table 19 in the ERD). The anticipated harvest impacts on the populations within the Snohomish Management Unit include those from Canadian fisheries (see Table 4 in the ERD). The management of Canadian fisheries is outside the jurisdiction of the co-managers. However, the co-managers do have jurisdiction over fisheries occurring within the SUS areas. For the Snohomish Management Unit, the anticipated range of exploitation rates for the SUS fisheries is 13 to 14 percent (see Table 3 in the ERD). The most likely exploitation rate within in this range is 13 percent (see Table 5 in the ERD).

Through modeling, NMFS identified the increased level of risk that may be associated with the SUS fisheries exploitation rates proposed in the RMP, when compared to the NMFS-derived rebuilding exploitation rate. Under the mostly likely scenario, a 13 percent SUS exploitation rate for the Skykomish River population will result in a 14 percentage point decrease in the probability of a rebuilt population in 25 years under current conditions. Modeling also suggests

that the implementation of the RMP will result in a 3 percentage point increase in the probability that the population will fall below the critical level during that same 25-year period (see Table 16 in the ERD).

The TRT recommends that any ESU-wide recovery scenario include at least two to four viable chinook salmon populations in each of the five geographic regions within Puget Sound, depending on the historical biological characteristics and acceptable risk levels for populations within each region. NMFS' assessment is that the RMP will contribute to rebuilding for seven of the ten populations within the North Puget Sound Region. The life history and run timing characteristics of the three populations identified as having an elevated level of risk for rebuilding (the lower Sauk River, the lower Skagit River, and the Skykomish River populations), are similar to the seven other populations in the region (see Table 7 in the ERD). Two of these three "at risk" populations are currently above their identified viable thresholds, and all three populations have an increasing trend in escapement since listing. Therefore, NMFS concludes that the RMP's management objectives are adequately protective of the geographic distribution, life history characteristics, and diversity of populations within the North Puget Sound Region of the ESU.

South Puget Sound Region – There are six populations delineated by the Puget Sound TRT within the South Puget Sound Region (see Figure 7 in the ERD). Genetically, most of the present spawning aggregations in the South Puget Sound Region are similar, likely reflecting the extensive influence of transplanted stock hatchery releases, primarily from the Green River population (PSTRT 2003). The TRT found that life history and genetic variations were not useful in determining populations within the South Puget Sound Region. Most chinook salmon in the South Puget Sound Region have similar life history traits.

In the ERD, NMFS found that the proposed RMP is anticipated to contribute to the stabilization or rebuilding of all populations within this region⁵. However, NMFS has identified a concern for two South Puget Sound Region populations due primarily to anticipated low abundance under the implementation of the RMP from May 1, 2005 through April 2010. A summary of the concerns for these two populations follows, but a more detailed analysis is provided in the ERD.

Cedar River and Sammamish River Populations: The Lake Washington Management Unit includes two populations; the Cedar River (Category 1) and the Sammamish River (Category 2) populations. The 1999 to 2002 four-year average escapements of 385 fish for the Cedar River population and 373 fish for the Sammamish River population are above the identified critical thresholds. The four-year average escapement of 385 fish for the Cedar River population is

⁵ With the level of escapement for the Duwamish-Green River population anticipated to continue to exceed the NMFS-derived viable threshold, the level of risk to this population associated with the implementation of the RMP is consistent with NMFS' standards.

below the RMP's upper management threshold for the population of 1,200 fish (see Table 8 in the ERD). The RMP proposes no upper management threshold for the Sammamish River population.

Since listing, the trend in escapement to the Cedar River has been stable, while the escapement to the Sammamish River population has exhibited an increasing trend (see Table 9 in the ERD). However, it is noted that the total escapement estimates for the Cedar River, as presented in Table 6 in the ERD, are based on an expansion of a live fish counts. Expansions of redd counts in the Cedar River suggest that this historical expansion of the live counts may be a conservative estimate of the total escapement. Additionally, the escapement estimates for the Sammamish River population do not include escapement into the Upper Cottage Lake or Issaquah Creeks. Therefore, although the escapement information used in this evaluation is believed to be representative of trends, the escapement estimates are considered a conservative estimate of the total escapement. A direct comparison of the Cedar River and Sammamish River escapements with the VSP generic guidance for a critical threshold of 200 fish should be considered conservative, as the total escapements for these two systems are likely greater than those depicted in Table 6 in the ERD.

Since 1998, the estimated natural escapement levels for both populations within the Lake Washington Management Unit have exceeded the VSP generic guidance for a critical threshold of 200 fish, but have remained well below the guidance for a viable threshold of 1,250 fish. Escapements into the Cedar River and the Sammamish River tributaries resulting from the implementation of the RMP are anticipated to range from 214 to 305 fish each (see Table 3 in the ERD). The most likely escapement for each population within this range is 295 fish (see Table 5 in the ERD).

Harvest impact modeling for the Lake Washington Management Unit indicates that the co-managers will continue to meet or exceed the critical threshold of 200 natural spawners for both populations within the management unit under the implementation of the RMP. However, given that the range of anticipated escapements approaches the critical thresholds for each population, and considering the volatility in escapement observed for these populations in the past, NMFS is concerned that these populations could experience very low abundance in the next several years, below the critical thresholds. However, there is a substantial contribution of stray hatchery-origin fish to the natural escapement in the Sammamish River tributaries. The Sammamish River population (Category 2 population) is not genetically distinct from these straying hatchery-origin fish. These hatchery-origin fish may lessen demographic concerns that may arise regarding low escapement for that population.

In the ERD, NMFS expressed concern for the Sammamish River population because the RMP provides no low abundance threshold for managing harvest impacts on the population. The co-managers propose that protective measures imposed to safeguard the Cedar River population, which include management constraints that would be applied when the population falls below its

low abundance threshold, will also incidentally benefit the Sammamish River population. The co-managers' argument is compelling because the Cedar River and Sammamish River populations are both affected by the same terminal area fisheries. NMFS agrees that it is reasonable to expect that terminal conservation management measures directed at migrating fish returning to the Cedar River would also benefit fish returning to the Sammamish River.

Limiting factors to chinook salmon survival and productivity in the Lake Washington basin are being addressed by improving fish passage conditions at the Ballard Locks, and restoration of anadromous fish access to 17 miles of the Cedar River above the Landsburg Dam. While these improvements will likely enhance spatial structure and productivity, there remain highly altered conditions in the Lake Washington basin and at the Ballard Locks that are daunting to juvenile salmon survival and emigration, and adult immigration.

The TRT recommends that an ESU-wide recovery scenario should include at least two to four viable chinook salmon populations in each of five geographic regions within Puget Sound, depending on the historical biological characteristics and acceptable risk levels for populations within each region. Despite potential risks that the Cedar River and Sammamish River populations may experience under the harvest management plan from May 1, 2005 through April 2010, the RMP is still expected to provide sufficient protection for four of the six populations in the South Puget Sound Region. The concerns for the Cedar River and Sammamish River populations do not represent much risk to the region. Identifying these two populations as a concern is considered a precautionary approach, as information suggests that the escapements estimated for these systems are likely conservative. NMFS believes that the RMP's management objectives are adequately protective of the geographic distribution, life history characteristics, and genetic diversity of the populations within the South Puget Sound Region of the ESU.

Hood Canal Region – Primarily because of their geographic isolation from other basins of the ESU, the TRT concluded that chinook salmon spawning historically in Hood Canal streams were independent from other chinook salmon spawning aggregations in the Puget Sound region (PSTRT 2003). There are two populations within the Hood Canal Region: the Skokomish River and the Mid-Hood Canal rivers populations (see Figure 7 in the ERD). Both populations are classified as a Category 2 population (see Table 7 in the ERD). Watersheds harboring Category 2 chinook salmon populations are areas where indigenous populations of the species are believed to no longer exist, but where sustainable wild populations existed historically and where habitat could still support such populations.

In the ERD, NMFS has identified a potential concern for harvest impacts on the spatial structure of the Mid-Hood Canal rivers population. This concern is heightened because of the low abundance in two of the individual rivers. A summary of the concerns for the Mid-Hood Canal rivers population follows, but a more detailed analysis is provided in the ERD.

Mid-Hood Canal Rivers Population: The 1999 to 2002 average escapement of 404 fish for the Mid-Hood Canal rivers population is only slightly above the RMP's low abundance threshold of 400 fish for the population (see Table 9 in the ERD). The Mid-Hood Canal rivers population has exhibited an increasing escapement trend since the time of listing (see Table 9 in the ERD). However, low levels of escapements in the Mid-Hood Canal Management Unit are anticipated to continue under the implementation of the RMP. The range of anticipated spawning escapements into the rivers of the Mid-Hood Canal Management Unit under the implementation of the RMP from May 1, 2005 through April 2010 is expected to range from 344 to 531 fish (see Table 3 in the ERD). The most likely escapement within this range is 504 fish (see Table 5 in the ERD).

The Mid-Hood Canal rivers population includes spawning aggregations in the Hamma Hamma, Duckabush, and the Dosewallips Rivers. Most harvest impacts on this population occur in mixed stock areas outside of the Hood Canal region. The effects of these mixed stock fisheries on the three components of the population are variable and unpredictable. It is therefore difficult for the co-managers to impose differential harvest effects on the individual spawning aggregate components in order to adjust spawning distribution among the rivers. In 2002, the natural escapement of 95 spawners into the Mid-Hood Canal Management Unit fell well below the VSP guidance for a critical threshold of 200 fish for this population. Total annual spawning escapements below 40 fish have been observed in recent years in each of the Duckabush and Dosewallips Rivers.

For the Mid-Hood Canal Management Unit, the anticipated range of total exploitation rates that would result from the implementation of the RMP is 26 to 34 percent. The most likely total exploitation rate within this range is 32 percent (see Table 14 in the ERD). Similar to the more northern chinook salmon management units discussed above, Canadian fisheries are expected to account for a substantial proportion of the total exploitation rate on this population (see Table 4 in the ERD). The most likely SUS exploitation rate anticipated under the implementation of the RMP is 13 percent.

Escapement into the individual systems has varied, with the spawning aggregation in the Hamma Hamma River representing the majority of the total Mid-Hood Canal rivers population abundance in recent years (see Table 6 in the ERD). Adult returns resulting from the WDFW-administered Hamma Hamma River supplementation program, which relies partially on broodstock returning to the river, has likely contributed substantially to the Mid-Hood Canal rivers population's increasing abundance trend (see Table 12 in the ERD).

The hatchery-origin adult fish that are progeny of broodstock collected from the Hamma Hamma River may buffer demographic risks to the Mid-Hood Canal rivers population in the short term, particularly to the component of the population spawning in the Hamma Hamma River. The general characteristics of the Mid-Hood Canal rivers population, including life history and run timing, are also found in the Skokomish River population (see Figure 7 in the ERD), the only other population within the region. Genetically similar stocks are also sustained by several

hatchery facilities in the Hood Canal area and in hatcheries in the South Puget Sound Region where the Green River-lineage are naturally or artificially sustained.

As mentioned in the ERD, the co-managers, in cooperation with NMFS, have modeled escapement results under a no Puget Sound fishery alternative. The most likely escapement for this management unit under the “no fishery” scenario is 527 fish, as discussed in more detail in the Final Environmental Impact Statement. With no Puget Sound fisheries, anticipated escapement into the Mid-Hood Canal rivers population would increase by only 23 fish, spread among the three component natural spawning rivers. Given the observed proportions of recent year escapements into the individual river systems comprising the Mid-Hood Canal Management Unit (see Table 12 in the ERD), the most likely increase in escapement into the Duckabush and Dosewallips Rivers will be only three and two fish, respectively. Based on modeling, further decreases in the proposed SUS fisheries-related impacts would have little effect on the persistence of the spawning aggregations in the Dosewallips and Duckabush Rivers.

The TRT recommends that an ESU-wide recovery scenario should include at least two to four viable chinook salmon populations in each of five geographic regions within Puget Sound, depending on the historical biological characteristics and acceptable risk levels for populations within each region. NMFS concludes the RMP’s management objectives are adequately protective of the geographic, life history, and diversity of the populations within the Hood Canal Region of the ESU. This conclusion takes into consideration that the hatchery-origin production may buffer demographic risks associated with the RMP to the Mid-Hood Canal rivers population. Additionally, the genetic similarity between the Mid-Hood Canal rivers population and populations within the Skokomish River and the South Puget Sound Region, which could serve as reserves, was also a factor. However, the primary reasons for the recommendation are the total abundance status of the population, the increasing escapement trend observed for the population, the annual monitoring and evaluation actions outlined in the RMP (discussed in the ERD), and the likelihood that further decrease in the SUS fisheries-related impacts would have limited beneficial effects.

Strait of Juan de Fuca Region - The TRT delineated two populations within the Strait of Juan de Fuca Region: the Dungeness River and the Elwha River populations (see Figure 7 in the ERD). Both populations are classified as Category 1 populations (see Table 7 in the ERD). Although the TRT identified only two historically extant populations within the Strait of Juan de Fuca Region, important components of the historical diversity within the Strait of Juan de Fuca Region may have been lost (PSTRT 2003).

Genetically, the chinook salmon in the Elwha River are very distinct from other Puget Sound populations (see Figure 5a in PSTRT 2003). Chinook salmon in the Dungeness River are also genetically distinct from other populations in Puget Sound and appear intermediate in their characteristics between eastern Puget Sound and the Elwha River populations (PSTRT 2003).

Habitat differences also exist between the Dungeness and Elwha River basins and other Puget Sound watersheds (PSTRT 2003).

Bases on the analysis provided above and in the ERD, NMFS finds that the RMP provides sufficient protection for the Elwha River population. However, NMFS has identified a heightened level of concern for the Dungeness River population, primarily because of the current status and the annual anticipated escapement resulting from the implementation of the RMP is expected to approach the VSP-derived critical threshold of 200 for the population. A summary of the risk analysis for the Dungeness River population follows, but a more detailed analysis is provided in the ERD.

Dungeness River Population: Since listing, the average escapements of 345 fish for the Dungeness River population has been above the VSP generic guidance for a critical threshold of 200 fish for this population, but below the RMP's low abundance threshold of 500 fish. The Dungeness River population has exhibited an increasing escapement trend since listing (see Table 9 in the ERD). Modeling of the Dungeness Management Unit indicates that the co-managers would continue to meet or exceed the critical threshold of 200 natural spawners under the implementation of the RMP from May 1, 2005 through April 2010. The range of escapements to the Dungeness River under the implementation of the RMP is expected to be 231 to 356 fish (see Table 3 in the ERD). The most likely escapement within this range is 336 fish (see Table 5 in the ERD). The range of anticipated escapements is below the RMP's low abundance threshold of 500 fish and approaches the VSP generic guidance for a critical threshold of 200 fish for this population.

The co-managers, in cooperation with federal agencies and private-sector conservation groups, have implemented a captive brood stock program to rehabilitate chinook salmon runs in the Dungeness River. Juvenile and adult fish produced through the hatchery program on the Dungeness River are listed with the natural-origin fish under the ESA. The primary goal of the supplementation and an associated fishery restriction program is to increase the number of fish spawning naturally in the river, while maintaining the generic characteristics of the existing broodstock.

Although there are no fishery harvest distribution estimates for the Dungeness Management Unit, in the adjacent Elwha Management Unit, it is estimated that the Alaskan and Canadian harvests have represented, on average, almost 80 percent of the total fishery impacts. A similar Alaskan and Canadian harvest distribution is likely for the Dungeness River population. Through modeling, the estimated range of exploitation rates that may be anticipated for the Dungeness Management Unit under the implementation of the RMP from May 1, 2005 through April 2010 is 22 to 29 percent. The most likely total exploitation rate within this range is 27 percent (see Table 14 in the ERD). However, the anticipated SUS exploitation rate for this population is very small; the SUS fisheries exploitation rate on this population is most likely to be 5 percent (see Table 5 in the ERD).

The co-managers will review the status of populations within the ESU annually. The co-managers, in cooperation with NMFS, will use this information to assess whether impacts on listed fish are as expected. When a population is anticipated to fall below its low abundance threshold, the co-managers have committed to consider additional actions when application of the RMP is not sufficiently protective in a given year, and when such additional actions would benefit the stocks.

NMFS concludes that the RMP would provide sufficient protection for the Strait of Juan de Fuca Region populations. This conclusion takes into consideration that the conservation hatchery program operating in the Dungeness River buffers the demographic risk to the Dungeness River population. This conclusion also considers the status and increasing escapement trend of the populations within this region, annual monitoring and evaluation outlined in the RMP (which is discussed in the ERD), the small anticipated SUS exploitation rate of less than five percent, and the likelihood that any further decrease in the SUS fisheries-related impacts would have limited beneficial effects on these populations. As discussed above and in the ERD, NMFS finds that the RMP's management objectives would be adequately protective of the geographic distribution, life history characteristics, and genetic diversity of populations within the Strait of Juan de Fuca Region of the ESU.

ESU Summary - The Puget Sound Chinook Salmon ESU, not the component, individual populations, is the primary focus of NMFS' evaluation of the impacts of the RMP under the ESA. In conducting this evaluation, NMFS takes into account the recommendations of the TRT, which is charged with identifying the biological characteristics of a recovered ESU as part of developing delisting and recovery criteria. As noted earlier, the TRT's preliminary recommendation is that any ESU-wide recovery scenario should include at least two to four viable chinook salmon populations in each of five geographic regions within Puget Sound, depending on the historical biological characteristics and acceptable risk levels for populations within each region. Biological criteria outlined in the ESA 4(d) Rule, NMFS' other mandates under the Endangered Species Act, and federal trust responsibilities to treaty Indian tribes will also be considered in developing NMFS' evaluation and resultant determination for the RMP.

NMFS concludes that the implementation of the RMP from May 1, 2005 through April 30, 2010, will adequately protect chinook salmon populations in the Georgia Strait Region based primarily on the increasing trends of the natural-origin populations, the additional contributions of hatchery-origin spawners to the natural spawning areas, and the low anticipated SUS exploitation rate. Additionally, NMFS' conclusion is based on information suggesting that past harvest constraints have had limited effect on increasing escapement of returning natural-origin fish, when compared with the return of hatchery-origin fish, and taking into consideration NMFS' treaty responsibility.

NMFS has determined that implementation of the proposed RMP will contribute to rebuilding for seven of the ten populations within the North Puget Sound Region. The life history and run timing characteristics of the three populations identified as having an elevated level of risk for rebuilding, are represented by the seven other populations in the region. Escapements for two of three “at risk” populations are currently above their identified viable thresholds, and all three populations have shown an increasing trend in escapement since listing. Therefore, NMFS concludes that the RMP’s management objectives would be adequately protective of the geographic distribution, life history characteristics, and genetic diversity of the populations within the North Puget Sound Region of the ESU.

Through its evaluation, NMFS expects that the proposed RMP would contribute to the stabilization or rebuilding of all populations within the South Puget Sound Region. Specific harvest impacts identified for two populations within the region, the Cedar River and Sammamish River populations, do not rise to a level that might represent a substantial risk to chinook salmon population rebuilding and recovery in the region when all populations are considered. Highlighting harvest impact concerns for these two populations is considered precautionary. Therefore, NMFS concludes that the RMP’s management objectives are adequately protective of the geographic distribution, life history characteristics, and genetic diversity of the populations within the South Puget Sound Region of the ESU.

The RMP’s management objectives are adequately protective of the geographic distribution, life history traits, and genetic diversity of the populations within the Hood Canal Region of the ESU. This conclusion is based on the production of the hatchery-origin fish that share the ecological and genetic traits of the natural-origin population, the status and increasing escapement trends of the two component populations, the annual monitoring and evaluation actions applied in the RMP to track population status and harvest impacts, the likelihood that further decrease in the SUS fisheries-related impacts would have limited effects on the persistence of the Mid-Hood Canal rivers population within this region, and the genetic similarity between the Mid-Hood Canal rivers population and populations within the Skokomish River and the South Puget Sound Region.

NMFS concludes that the RMP will also provide adequate protection for chinook salmon originating from the Strait of Juan de Fuca Region. This conclusion is based on the status and increasing escapement trends of the populations, the annual monitoring and evaluation actions outlined in the RMP, the low anticipated SUS exploitation rates, the likelihood that any further decrease in the SUS fisheries-related impacts would have limited beneficial effects on the persistence of these two populations, and on consideration that the hatchery-origin fish produced for conservation purposes in the two watersheds within this region share the ecological and genetic traits of the natural-origin populations.

1.10 Conclusion

Based on these conclusions and the analysis presented in previous sections, NMFS finds that the RMP's management objectives, in combination with other ongoing habitat and hatchery efforts, would provide adequate protection for each of the five regions of the ESU. Therefore, NMFS concludes that the implementation of the RMP from May 1, 2005, through April 2010, would not likely to jeopardize the continued existence of the Puget Sound Chinook Salmon ESU.

No critical habitat is designated for the Puget Sound Chinook Salmon ESU.

2.0 Incidental Take Statement

With NMFS' approval of the RMP, the ESA take prohibitions will not apply to activities conducted pursuant to the RMP. Therefore, the proposed Federal actions, including the approval of the RMP under the ESA 4(d) Rule are not subject to take prohibitions. Accordingly, no incidental take statement has been prepared.

3.0 Conservation Recommendation

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. NMFS believes the following conservation recommendations are consistent with these obligations, and therefore should be implemented by the BIA and USFWS.

- (1) The BIA, USFWS, and NMFS, in collaboration with the affected states and tribes, should evaluate the ability of the listed Puget Sound Chinook Salmon ESU to survive over the longer term (past the duration of the RMP) and recover, given the totality of impacts affecting the ESU during all phases of the salmonid's life cycle, including freshwater, estuarine, and ocean life stages. For this effort, the BIA and USFWS should collaborate with the affected co-managers to evaluate available life cycle models or initiate the development of life cycle models where needed.
- (2) The BIA, USFWS, and NMFS, in collaboration with the affected states and tribes, should evaluate possible improvement in gear technologies and fishing techniques that would reduce mortality of listed species.

- (3) The BIA, USFWS, and NMFS, in collaboration with the affected states and tribes, should continue to evaluate the feasibility of selective and non-retention fishing techniques in commercial and recreational fisheries to reduce impacts on listed species without compromising data quality used to manage fisheries.
- (4) The BIA, USFWS, and NMFS, in collaboration with the affected states and tribes, should continue to improve the quality of information gathered on ocean rearing and migration patterns to improve the understanding of the utilization and importance of these areas to listed ESUs.
- (5) The BIA, USFWS, and NMFS, in collaboration with the affected states and tribes, should continue to evaluate the potential selective effects of fishing on the size, sex composition, or age composition of salmon populations.

4.0 Re-initiation of Consultation

This concludes formal consultation on the NMFS, BIA, and USFWS sub-actions as they relate to the RMP and the Puget Sound chinook ESU. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if:

- (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
- (2) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or
- (3) a new species is listed or critical habitat designated that may be affected by the identified action.

In making its no jeopardy conclusion, NMFS recognizes the co-managers' adaptive management process outlined in the RMP. Consistent with an adaptive management approach, a change in the exploitation rate or rates proposed in the RMP will not be considered grounds to re-initiate this consultation as long as the change in the exploitation rate or rates are within the risk criteria NMFS used in its evaluation (page 25 of the ERD). The risk criteria are those used by NMFS to derive the rebuilding exploitation rates (e.g., Did the percentage of escapements less than the critical threshold value increase by less than five percentage points relative to the no-fishing baseline *and either* (b) Does the escapement at the end of the 25-year simulation exceed the viable threshold at least 80 percent of the time *or* (c) Does the percentage of escapements less than the viable threshold at the end of the 25-year simulation differ from the no-fishing baseline by less than 10 percentage points). Additionally, a change in the escapement goal or goals proposed in the RMP will not be considered grounds to re-initiate this consultation as long as the

change in the escapement goal or goals are based on the best estimates of the productivity and capacity of the system. Prior to determining whether re-initiation is necessary, NMFS will review the change in the exploitation rate or escapement goal and document its findings.

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6.0 Magnuson-Stevens Act Essential Fish Habitat Consultation

This is NMFS' Magnuson-Stevens Fishery Conservation and Management Act (MSA) consultation on its determination for the RMP over the next five years, from May 1, 2005, through April 30, 2010, as described in the above ESA section 7 consultation.

6.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (Section 305 (b)(2));

NMFS must provide conservation recommendations for any Federal or State action that would adversely affect EFH (Section 305(b)(4)(A));

Federal agencies must provide a detailed response in writing to NMFS within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS' EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (Section 305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA Section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NMFS is required for any Federal agency actions that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects on EFH.

6.2 Identification of Essential Fish Habitat

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: chinook salmon; and coho salmon; and Puget Sound pink salmon (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects on these species' EFH from the proposed action is based, in part, on this information.

6.3 Proposed Action and Action Area

The proposed action and action area are detailed above in the above Biological Opinion. The action area for this EFH consultation is the area defined by the RMP, Washington waters from the mouth of the Strait of Juan de Fuca at Cape Flattery, eastward. The primary Federal sub-action is the NMFS proposal to issue a determination as to whether the RMP submitted by the co-managers meets the requirements of Limit 6 under the ESA 4(d) Rule. The action area includes habitats that have been designated as EFH for various life-history stages of Puget Sound chinook salmon.

NMFS is including two other proposed Federal actions in this consultation because they are similar actions within a given geographical area. The duration of all of the proposed Federal actions is through April 30, 2010. The three proposed actions are summarized here, and are described in more detail in the above Biological Opinion.

- (1) The proposed NMFS determination as to whether the RMP adequately addresses the criteria outlined in the ESA 4(d) Rule. Management objectives specified in the RMP account for fisheries-related mortality throughout the migratory range of Puget Sound chinook salmon, from Oregon to Southeast Alaska.
- (2) The proposed BIA funding of Puget Sound tribes' management, enforcement, and monitoring projects in support of the RMP. Only the funding of projects that may impact listed Puget Sound chinook salmon through April 30, 2010, are considered in this consultation.

- (3) The proposed USFWS authorization of fisheries, as a party to the Hood Canal Management Plan (Point No Point Treaty Council *et al.* 1986), that is consistent with the implementation of the RMP, as approved under the ESA 4(d) Rule. Only fisheries that may impact listed Puget Sound chinook salmon through April 30, 2010, are considered in this consultation.

6.4 Effects of the Proposed Action

The harvest-related activities of the proposed actions considered in this consultation involve boats using hook-and-line gear and commercial net gear. The use of these gears affects the water column and the shallower estuarine and freshwater substrates, rather than the deeper water, offshore habitats. The PFMC assessed the effects of fishing on salmon EFH and provided recommended conservation measures in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999).

The PFMC identified five types of impact on EFH: (1) gear effects; (2) harvest of prey species by commercial fisheries; (3) removal of salmon carcasses; (4) redd or juvenile fish disturbance; and (5) fishing vessel operation on habitat. Of the five types of impact on EFH identified by the PFMC for fisheries, the concern regarding gear-substrate interactions, removal of salmon carcasses, redd or juvenile fish disturbance and fishing vessel operation on habitat are also potential concerns for the salmon fisheries in Puget Sound.

- (1) *Gear effects and fishing vessel operation (4)*: Possible fishery-related impacts on riparian vegetation and habitat would occur primarily through bank fishing, movement of boats and gear to the water, and other stream side usages. The types of salmon fishing gear that are used in Puget Sound salmon fisheries in general actively avoid contact with the substrate because of the resultant interference with fishing and potential loss of gear. In addition, the proposed fishery implementation plan includes actions that would minimize these impacts, such as area closures. Also these effects would occur to some degree through implementation of fisheries or activities other than the Puget Sound salmon fisheries, i.e., recreational boating and marine species fisheries. Construction activities directly related to salmon fisheries are limited to maintenance and repair of existing facilities (such as boat launches), and are not expected to result in any additional impacts on riparian habitats because of the proposed salmon fisheries. The facilities used in association with the fisheries are essentially all in place. Therefore, the proposed fisheries would have a negligible additional impact on the physical environment.
- (2) *Removal of salmon carcasses*: The PFMC conservation recommendation to address the concern regarding removal of salmon carcasses was to manage for maximum sustainable spawner escapement and implementation of management measures to prevent over-fishing. Both of these conservation measures are basic principles of the RMP. Therefore,

management measures to minimize the effects of salmon carcass removal on EFH are an integral component of the management of the proposed fisheries.

- (3) *Redd or juvenile fish disturbance*: Trampling of redds during fishing has the potential to cause high mortality of salmonids. Boat operation can result in stranding and mortality related to pressure changes in juveniles (PFMC 1999). The PFMC report recommended angler education and the closer of key spawning areas during the time that eggs and juvenile salmon were present. Salmon fisheries are closed or fishing activities do not occur in freshwater areas in Hood Canal, North Puget Sound and the Strait of Juan de Fuca during peak spawning, rearing and out-migration periods (S. Theisfeld, WDFW and T. Johnson, WDFW, per. comm. with S. Bishop, NMFS, May 12, 2004). Notices are posted near fishing access areas by WDFW and the Washington Parks Department, and news releases are distributed by WDFW before each fishing season explaining responsible fishing behavior, including avoidance of spawning areas and damage to riparian areas (T. Johnson, WDFW per. comm. with S. Bishop, NMFS, May 12, 2004). The Puyallup and White River in South Puget Sound are closed to salmon fishing through much of chinook salmon migration and spawning. These management measures should minimize redd or juvenile fish disturbance due to conduct of the proposed Puget Sound salmon fisheries.

The fisheries consistent with the implementation of the RMP would have a negligible impact on the physical environment.

6.5 Conclusion

For the reason discussed above, NMFS concludes that the proposed Federal action would not adversely affect designated EFH for chinook salmon or for other fish species for which EFH has been designated.

6.6 EFH Conservation Recommendation

Pursuant to Section 305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. However, because NMFS concluded that the proposed Puget Sound salmon fisheries would not adversely affect the EFH, no conservation recommendations are needed.

6.7 Statutory Response Requirement

Because there are no conservation recommendations, there are no statutory response requirements.

6.8 Consultation Renewal

The NMFS must reinitiate EFH consultation if the proposed actions are substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR Section 600.920(k)).

7.0 References

Pacific Fisheries Management Council (PFMC). 1999. Appendix A to Amendment 14 to the Pacific Coast Salmon Plan. Identification and Description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. Portland, Oregon. 146pp.

Point No Point Treaty Council, U.S. Fish and Wildlife Service and Washington Department of Fish and Wildlife. 1986. Hood Canal Salmon Management Plan.

8.0 Data Quality Act Documentation and Pre-Dissemination Review

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) ("Data Quality Act") specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Biological Opinion and the Magnuson-Stevens Act Essential Fish Habitat Consultations addresses these DQA components, documents compliance with the Data Quality Act, and certifies that this Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultations have undergone pre-dissemination review.

8.1 Utility: Consultation by Federal agencies with NMFS is required under section 7 of the ESA whenever a Federal agency approves funds or carries out an action that might affect a listed species. This consultation was required under the ESA to determine whether the implementation of the RMP's proposed Puget Sound salmon fisheries would appreciably reduce chinook salmon population survival and recovery, jeopardizing the affected ESU before the BIA could proceed with administration of tribal fishery management programs or the USFWS could approve fishing activities involving the proposed Puget Sound salmon fisheries. Supplying copies of the document to the management agencies provides them with the documentation that NMFS has determined that the proposed fisheries will not jeopardize the continued existence of the affected ESUs. Providing copies to WDFW and the NWIFC is consistent with their roles as fishery managers for the affected ESUs and with NMFS' obligations under Secretarial Order 3206 (Department of Interior Order 3206, American Indian Tribal Rights, Federal-Tribal Trust Responsibilities and the Endangered Species Act).

8.2 Integrity: This consultation was completed on a computer system managed by NOAA Fisheries in accordance with relevant information technology security policies and standards set out in Appendix III, “Security of Automated Information Resources,” Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

8.3 Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased, and were developed using commonly accepted scientific research methods. They adhere to published standards including the NOAA Fisheries ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01 et seq., and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) implementing regulations regarding Essential Fish Habitat, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this biological opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NOAA Fisheries staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.